

STUDIES IN THE GENUS *CASSIA* IN SOUTH AFRICA:

1. TAXONOMIC NOTES ON SPECIES OF THE SUB-GENUS *LASIORHEGMA*, SECTION *CHAMAECRISTA*

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ABSTRACT

Seven species within *Cassia*, Subgenus *Lasiorhegma*, Section *Chamaecrista*, are recorded for the area covered by the *Flora of Southern Africa*, namely South West Africa, Lesotho, Swaziland and South Africa. Three varieties are not maintained because each is considered as falling within the range of another established variety: one new variety is erected. A key permitting the identification of these species and their infraspecific variants is given.

UITTREKSEL

'n STUDIE VAN DIE GENUS *CASSIA* IN SUID-AFRIKA:

1. TAKSONOMIESE AANTEKENINGE OOR DIE SUB-GENUS *LASIORHEGMA* SEKSIE *CHAMAECRISTA*

Sewe spesies in die genus *Cassia*, Subgenus *Lasiorhegma*, Seksie *Chamaecrista* word aangedui in die gebied wat deur die *Flora van Suidelike Afrika* gedek word (Suidwes-Afrika, Lesotho, Swaziland en Suid-Afrika). Drie variëteite word weggedoen omdat daar gereken word dat hulle binne die perke van ander gevestigde variëteite val. Terselfdertyd word een nuwe variëteit geskep. 'n Sleutel vir die identifikasie van die onderskeie spesies en hulle naverwante variëteite word aangegee.

The distribution of *Cassia* L. is throughout the tropical and sub-tropical regions of the world. Within this widespread genus, Baker (1930) delimited three sub-genera, *Cathartocarpus* Pers. (*Fistula* DC.), *Senna* Benth. and *Lasiorhegma* Vogel. Within the last of these he recognized two sections, *Absus* Benth. and *Chamaecrista* Benth. The last section, *Chamaecrista* (Moench) DC. = [*Chamaecrista* Benth.] is represented in the sub-tropical regions of Asia, in Sri-Lanka (Ceylon) and in tropical and sub-tropical Africa. Because of the close relationships of its taxa, the section is difficult taxonomically.

Steyaert (1950), in revising its Asian and Tropical African representatives, and Brenan (1967), in his treatment of *Cassia* for the *Flora of Tropical East Africa*, laid a sound taxonomic foundation for the species of this Section, but did not deal with the Southern African plants. For South West Africa, Schreiber (1967) found only three of its species represented, namely *C. mimosoides* L., *C. biensis* (Steyaert) Mendonça & Torre, and *C. falcinella* Oliv. var. *parviflora* Steyaert.

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For South Africa, Harvey (1862) recognized only *C. mimosoides* with varieties *capensis* Thunb., *stricta* E. Mey. and *comosa* E. Mey. Forbes (1922), in revising the Natal species of the genus, followed Harvey, as have other workers concerned with the preparation of provincial or local floras or check lists, an exception to this being the recent publication by Ross (1972).

In undertaking taxonomic revision of *Cassia* for the *Flora of Southern Africa*, and bearing in mind comments by previous workers within the Section *Chamaecrista*, such as those of Harvey (1862: 273) who wrote of *C. mimosoides*,

"A common tropical and sub-tropical weed, which has received at least a score of names in different countries. . . . I find it impossible strictly to limit the variation, and all the South African varieties inhabit the same districts, and probably often grow intermixed."

and Brenan (1967),

"... the species . . . belonging to the Section *Chamaecrista* . . . are critical and often closely related and taxonomically extremely difficult. Many of them are imperfectly known and often with very little material available for study Those who have studied carefully these critical *Cassias* in the living condition agree about their distinctness, but not infrequently it happens that the species appear easier to separate when alive than in the herbarium."

it was obvious that special attention would have to be given to study of plants of this section in herbaria, in the field and probably under cultivation, before the main work of revision was commenced. This was done. The paper that follows presents notes relevant to the taxonomic treatment of species of this section that cannot conveniently be included in the main revision of the genus which will be published elsewhere.

1. *Cassia comosa* (E. Mey.) Vogel, Syn. Gen. Cassiae: 65 (1837); Ghesq. in Bull. Jard. bot. Etat Brux. 9: 153 (1932); Steyaert in Bull. Jard. bot. Etat Brux. 20: 251 (1950); Brenan in F.T.E.A. Leg. (Caesal.): 89 (1967). Type: South Africa, E. Cape Province, between Umzimvubu R. [Omsamwubo] and Umsikaba R. [Omsamcaba], Drège (? B. holo.).

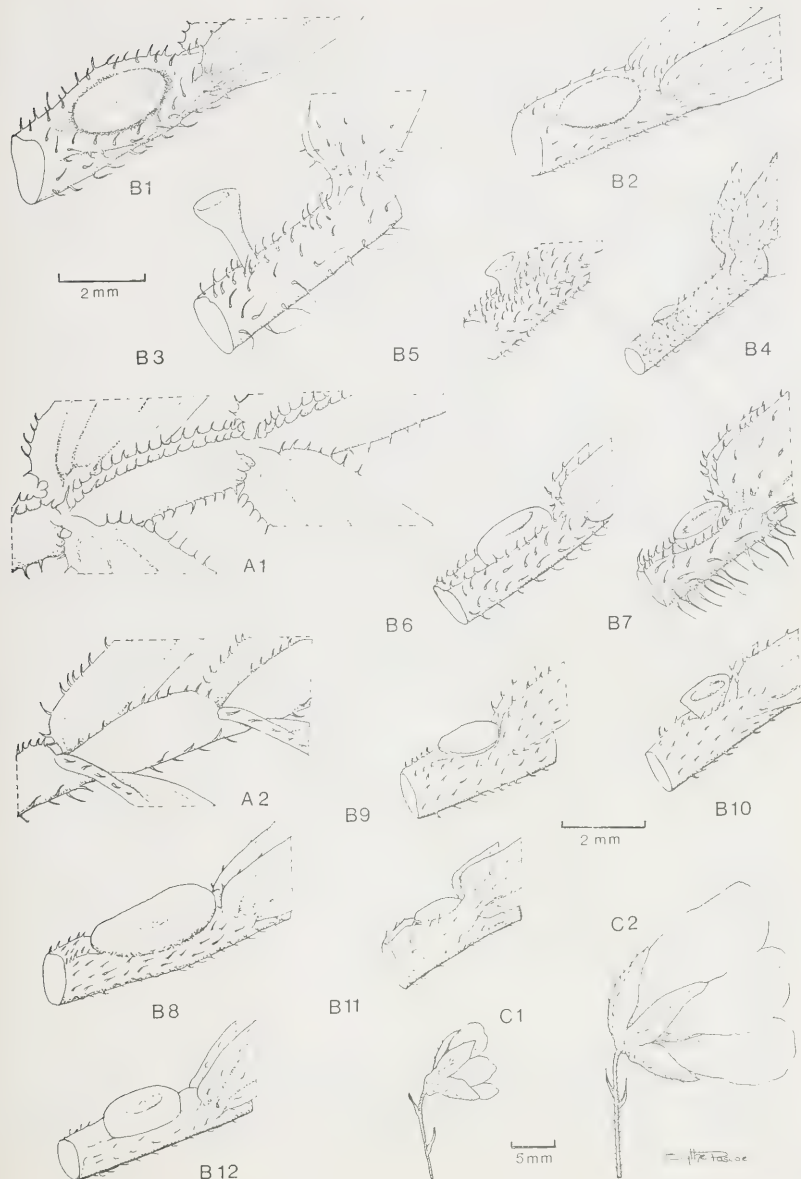
C. mimosoides L. var. *comosa*, Harv. in Fl. Cap. 2: 273 (1862).

Chamaecrista comosa E. Mey., Comm. Pl. Afr. Austr.: 160 (1836).

This tropical and southern eastern African perennial is probably the most easily recognized of the South African species falling within the Section *Chamaecrista*: its large sessile petiolar gland (Fig. 1 B1, B2), leaf rhachis with adaxial

FIG. 1.

Features used in the preliminary rapid identification of species within the Section *Chamaecrista* in southern Africa (excluding Rhodesia and Mozambique): A—Adaxial surface of leaf rhachis: 1—channelled (*C. quarrei* illustrated), 2—crested (*C. plumosa* illustrated); B—Petiolar gland: 1—*C. comosa* var. *comosa*, 2—*C. comosa* var. *capricornia*, 3—*C. capensis* segregant glandulastipitata, 4—*C. capensis* var. *capensis* (also many specimens of var. *flavescens*), 5—*C. biensis*, 6—*C. quarrei*, 7—*C. falcinella* var. *parviflora*, 8—*C. mimosoides* segregant natalensis, 9—*C. mimosoides* segregant zululandensis, 10 & 11—*C. mimosoides* segregant okavangoensis, showing variation from slightly stalked to sessile, 12—*C. plumosa*; C—Flowers, to show variation in size: 1—*C. biensis*, 2—*C. capensis*.



channel, wide leaflets (Fig. 2f, g) and large flowers are distinctive. Steyaert (1950) established two varieties within it: var. *lanata* which differed from typical *C. comosa* in its lanate pubescence covering almost all parts of the plant, and its smaller leaves and leaflets, and var. *capricornia* that was smaller in all its parts, but undoubtedly related by the similarity in form of the petiolar gland.

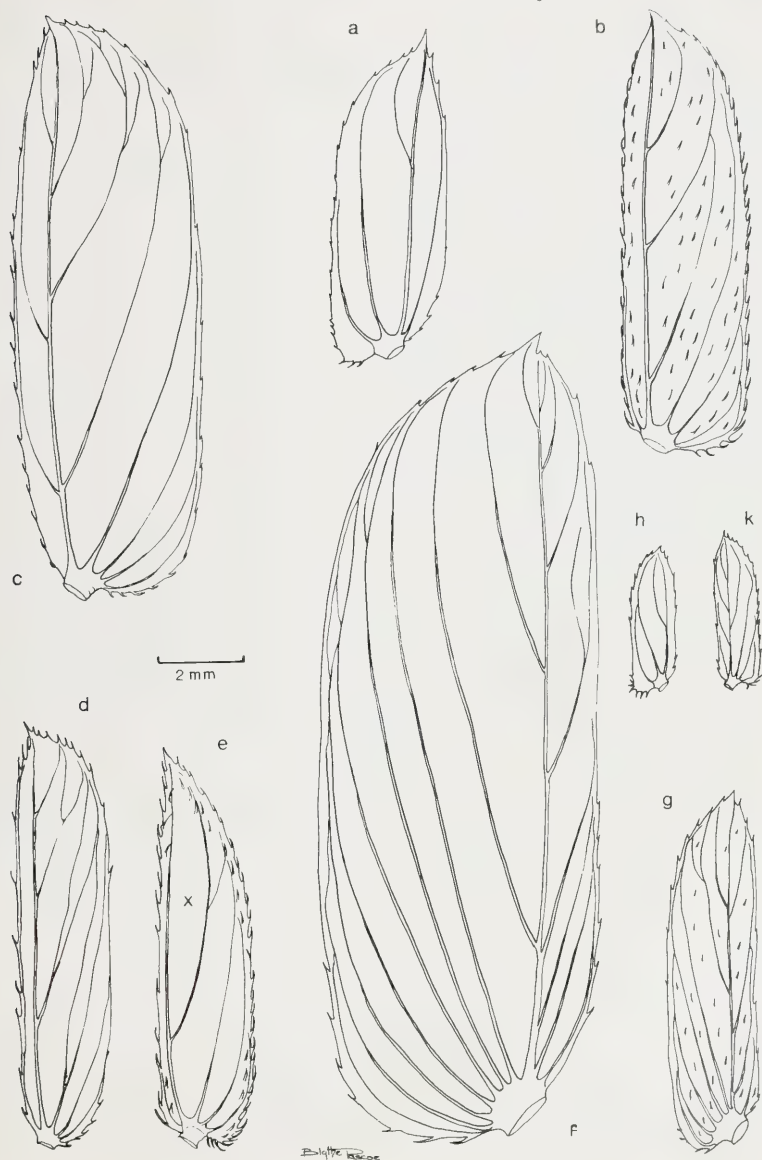
In our opinion "lanate" (woolly) is not accurately descriptive of the indumentum represented on the type of var. *lanata* (Natal, Mtunzini, Myezaan Zulu Reserve, near Nyoni, Wood 3855, K, holo; NH, iso!), since the hairs are not matted. "Velutinous" (velvety) seems a better term to apply, and this will be used where relevant, in the account that follows.

The type of the species (var. *comosa*) comes from the southernmost limit of the known distributional range. Here plants are often glabrous or glabrate, with large leaves and leaflets. Some decrease in the size of these organs seems to occur northwards and away from the coast, so that some plants from Richard's Bay, False Bay, Ngoye and Eshowe are not so robust. Study of populations in the field suggests this variation may be more closely linked with differences in microhabitat than with gradients in latitude and altitude, however. Steyaert's type of var. *lanata* is one of these slightly smaller leaved plants, but a velutinous pubescence is not correlated with smaller leaf size. Within the same population plants may vary slightly in leaf and leaflet size and in density of indumentum. There is usually, also, a falling off in the hairiness of a plant with increasing age. Because of this variation within a population, and because within var. *capricornia* also (see later) a wide range in density of the indumentum, especially of stems, occurs, var. *lanata* is not maintained but is included within var. *comosa*.

Steyaert (1950: 252) recorded typical *C. comosa* for Natal only, and var. *lanata* for Natal and Malawi (Nyasaland). From the distributional information given by Brenan (1967: 89), it must be implied that var. *comosa* is in Malawi and Moçambique, but it is not clear whether it is present with var. *capricornia* in the Congo Republic and Tanzania (Tanganyika). His description of the species includes "stems . . . densely spreading hairy", but he does not mention var. *lanata* as such. Existing records suggest var. *comosa* (including var. *lanata*?) is present on the coastbelt of Moçambique, but its presence in Rhodesia and Zambia requires confirmation.

FIG. 2.

Leaflet structure (each leaflet removed from midway along leaf rachis): a—*C. quarrei*, b—*C. falcinella* var. *parviflora*, c—*C. capensis* segregant glandula-stipitata, d—*C. capensis* var. *capensis*, e—*C. biensis* (the areola marked X usually characterizes the leaflets of this species), f—*C. comosa* var. *comosa*, g—*C. comosa* var. *capricornia*, h—*C. plumosa*, k—*C. mimosoides*.



Steyaert named var. *capricornia* for its distribution in relation to the Tropic of Capricorn "La distribution de cette variété à cheval sur le tropique du capricorne lui vaut son nom.", but South African records show its presence in Swaziland and the Transvaal, northwards from 27°S. It is not known from Natal (Fig. 4). The two varieties have different habitat requirements. Var. *comosa* is restricted to open grassland with a high water table on sand or granite soils. All known records are from near the coast, Ngoye Forest and Hlinza Forest near Eshowe being the furthest inland. In 1911 Rudatis found plants at Dumisa, a little inland from Umzinto. Now-a-days a distributional disjunction seems to exist on the coastbelt of Natal between the Port Shepstone and Mtunzini districts: it is tempting to attribute this to the destruction by man of suitable habitats in his cultivation of the land. Var. *capricornia*, in contrast, occurs in drier areas, usually in grassland or among boulders, often on sandy or gravelly soils, frequently where there has been some disturbance of the primary vegetation: occasionally plants colonize old lands. The Swaziland and Transvaal plants are not uniform in indumentum but show the same range in density of hairs, particularly on stems, that is represented within var. *comosa*, with var. *lanata* included within it.

Thus, according to known records, the varieties *comosa* and *capricornia* are allopatric in South Africa. This pattern of distribution, together with their minor morphological differences and distinct habitat preferences, suggests subspecific ranking would more correctly reflect, taxonomically, the natural variability within *C. comosa* in South Africa than does the present infraspecific treatment. But not all workers agree upon the need for geographic discontinuity in the definition of subspecies. Nor are the distribution patterns further north fully known.

Steyaert (1950) described *C. parva* which, according to Brenan (1967: 89) is one of the least well defined species of the Section. He says of it, "the material is not homogenous and seems to comprise a series of forms intermediate between and to some extent linking up *C. comosa* on the one hand and *C. katangensis* on the other." Differences in size and shape of the petiolar gland and its degree of projection above the petiole, as well as slightly narrower leaflets (1.25–3.0 mm in *C. parva*; 1.4–3.0 mm in *C. comosa* var. *capricornia*), distinguish *C. parva* from *C. comosa* var. *capricornia*. Steyaert (1952) in his key separated them on petiolar gland colour alone (black in the former, yellow in the latter). No specimens agreeing precisely with the type of *C. parva* have been seen from S. Africa in the present study. However the closeness of the relationships of these taxa and the non-homogeneity of *C. parva* make further study of these species desirable. This will be done to best advantage in the Flora Zambesiaca area, which zone forms a link between Tropical East and South Africa, and where the taxa in question have not yet been fully documented.

SELECTED CITATIONS

var. *comosa*

NATAL—2831 (Nkandla): Eshowe distr., Eshowe swamps (-CD), *Gerstner s.n.* (PRE, NH).

—2832 (Mtubatuba): Hlabisa distr., w. of St. Lucia Estuary (-AD), *Feely & Ward 5* (PRE, NH, NU).

CAPE—3129 (Port St Johns): Transkei, Lusikisiki distr., Magwa Falls (-BC), *Davies s.n.* (NU).

var. *capricornia*

TRANSVAAL—2430 (Pilgrim's Rest): Pilgrim's Rest distr., Blyde R. Nature Reserve (-BD), *Burt & Hilliard 6029* (PRE, NU).

SWAZILAND—2631 (Mbabane): Mbabane distr., Mbabane (-AC), *Burt & Davy 2761* (PRE).

2. *Cassia capensis* Thunb. Prod. Pl. Cap. 1: 79 (1794); Lodd. in Bot. Cab. VI: 511 (1821); Thunb. in Fl. Cap. 1: 388 (1823); Vogel in Syn. Gen. Cassiae: 64 (1837); Steyaert in Bull. Jard. bot. Etat Brux. 20: 250 (1950). Type: South Africa, Cape Province, between Loerie (?) [Luri] and Sundays R. [Sontags] *Thunb. s.n.* (UP, holo).

C. mimosoides L. var. *capensis* Harv. in Fl. Cap. 2: 273 (1862).

Chamaecrista capensis (Thunb.) E. Mey. in Linnaea, 7: 172 (1832) et in Comm. Pl. Afr. Austr. 1: 158 (1836).

C. capensis is another perennial species within the Section that is fairly easily recognized. Steyaert (1950: 250) remarked that it is probably the only species of *Chamaecrista* in which the inflorescences are really axillary. This, together with the large flowers (Fig. 1 C2), the long pedicels, which are evident at the fruiting stage also (nothing of the same magnitude has been recorded for tropical species), and the strongly excentric midrib to each leaflet (Fig. 2c, d), serve to distinguish *C. capensis*. Its distribution is also more temperate than that of its relatives (Fig. 5).

Morphologically it is not homogenous and infraspecific categories have been recognized within it. Meyer (1836) established within *Chamaecrista capensis*, var. *flavescens* (Type: South Africa, Cape Province, between the Gekau and Bashee Rs. [Basche], alt. 1 500–2 000 ped., *Drège*, B, holo.) for plants that differed from Thunberg's type in being more robust with patently hairy stems: on the lateral branches these spreading hairs were yellow. The leaves were longer with the petiolar glands often obsolete. Vogel (1837) maintained this variety under *Cassia capensis*. Steyaert (1950) described var. *keiensis* (Type: South Africa, Cape Province, King William's Town distr., Kei Road, *Dyer 1703*, K,

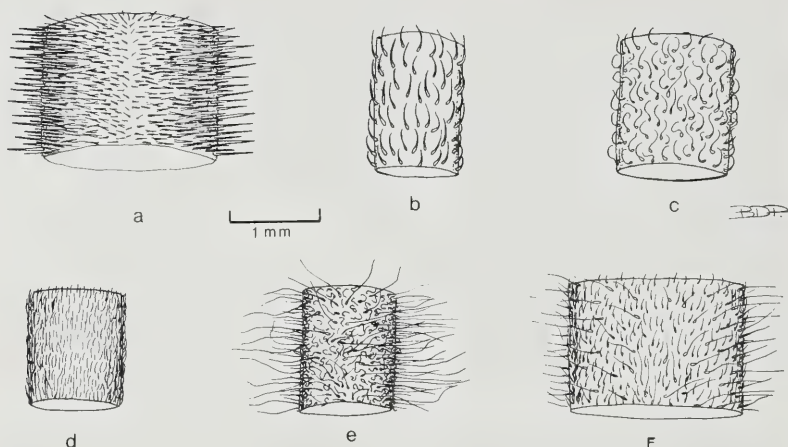


FIG. 3.

Stem pubescence: a—*C. plumosa* var. *erecta* (Hilliard 3883), b—*C. plumosa* var. *plumosa* (Ward 1873), c—*C. biensis* (Maguire 2212), d—*C. capensis* var. *capensis* (Long 889), e—*C. capensis* var. *keiensis* (Dyer 1703 isotype), f—*C. capensis* var. *flavescens* (Flanagan 54).

holo.: PRE, GRA, iso!) for plants that were covered by a more or less silky indumentum except on the petals and parts of the leaves¹

Study of the species in field and herbarium has revealed the variability in growth form, robustness of stems and leaves, density and composition of indumentum (Fig 3d, e, f), degree of channelling of the adaxial surface of the leaf rachis, and the number and extent of development of the petiolar glands (Fig. 1 B4) that occur in different plants. These characters are not necessarily correlated, so that a range of morphological form is represented. Some specimens differ from typical *C. capensis* only in the presence of many patent long hairs among the shorter hairs of the indumentum. These shaggy hairs impart a velutinous appearance to the stems that is visible to the naked eye: often these hairs are fulvus or yellowish, so that the younger parts of the plant, where the hairs are closely-packed, appear sericeus, fulvus or bright yellow. Steyaert's var. *keiensis* was established for sericeously hairy specimens.

Sometimes these characters are correlated, and some plants, especially well represented from East London northwards to Port Shepstone, are robust, erectly growing sub-shrubs or sub-suffrutes with larger leaves, poorly defined

¹ Steyaert, 1950: 251 records the locality for Dyer 1703, K, as Kingwilliamstown distr., Kci Road, but isotypes in PRE: GRA both carry the locality "near Debe Nek", Middel-drift distr.).

channelling to the adaxial surface of the leaf rhachis, two, one, a rudimentary, or no petiolar gland, and a fulvus or bright yellow velutinous indumentum. Meyer's var. *flavescens* was established for such robust, velutinous specimens. Not all robust plants develop long straight patent hairs, however. Some lack these hairs entirely and are either glabrate or glabrous to the naked eye.

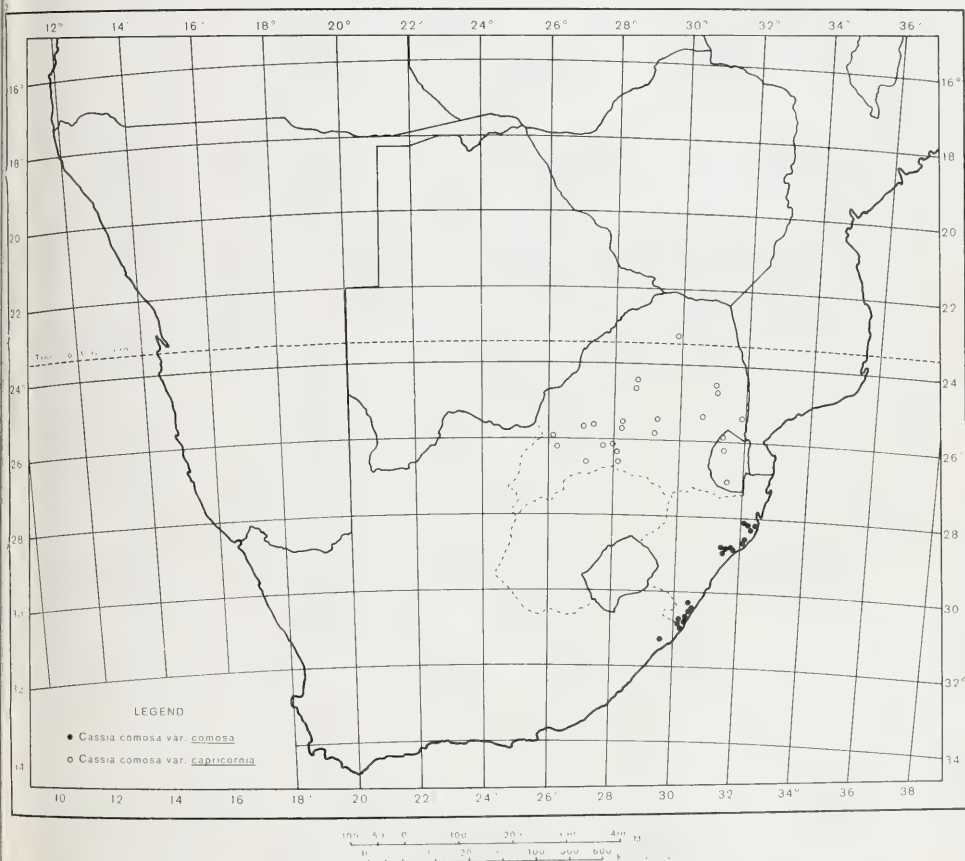


FIG. 4.
Cassia comosa—known distribution in southern Africa (excluding Rhodesia and Moçambique) up to 1974.

With such variability, effective infraspecific classification becomes difficult. It is considered unnecessary to maintain Steyaert's variety, for it represents only part of the range of variability already recorded. It is, therefore, included within var. *flavescens*, in which taxon are included all robust plants whether they be velutinous or glabrous.

Plants falling within var. *flavescens* are not confined to the eastern Cape. They have been recorded from as far north and inland as Kranskop in Natal, Swaziland and the south and central Transvaal. Most of these outliers resemble the type of Steyaert's var. *keiensis* rather than the very robust, erectly growing plants that are so well represented in the Transkei and southern Natal.

Var. *capensis* is also found in the Transvaal, but its main area of distribution is in the Cape from Cathcart and Kingwilliamstown southwards to Humansdorp. A single gathering (*White 480*, PRE) from Kleinmonde [Kleinmond]? suggests this variety may extend almost to the Cape Peninsula, but this needs confirmation that was not obtained during the present study. Steyaert 1950:250 cited M.M. *Stewart 110*, K from Hlatikulu, Swaziland as var. *capensis* but this is better placed with var. *flavescens* and corresponds with recent gatherings from this country by Compton. The distributional limits of the species are not adequately known. Attempts to locate it in Zululand, the northern Transvaal, Moçambique and Rhodesia are needed.

A further variant, presently known by only few specimens from disjunct localities (the Hluhluwe district of Natal, the Pietersburg district of the Transvaal and an unspecified locality in Moçambique) must tentatively be placed with *C. capensis*. The long axillary pedicels and the strongly excentric midrib to the leaflet suggest this relationship. There is similarity also in the small size and fewer pinna pairs of the leaves developed low on the stems. The clearly stalked petiolar gland (stalk 1.0–1.5 mm long) (Fig. 1 B3) and the flowers that are smaller than usual for *C. capensis*, yet larger than those of many other species of *Chamaecrista*, make this segregant distinctive. The stipitate petiolar gland suggests relationship with other more tropically distributed taxa, *C. zambesica* Oliv., *C. fallacina* Chiov. and others, but the relationship with *C. capensis* is much more clearly marked. At present it is considered unwise to establish an infraspecific taxon for what may prove to be an occasional genetic segregant (perhaps unlikely in view of Ward's *two* gatherings from *two* localities in the Hluhluwe district). Consequently such plants are temporarily identified as *C. capensis* segregant glandula-stipitata. The term "segregant" is used rather than "variant" to avoid any confusion with "variety" and the abbreviation to "var.".

SELECTED CITATIONS

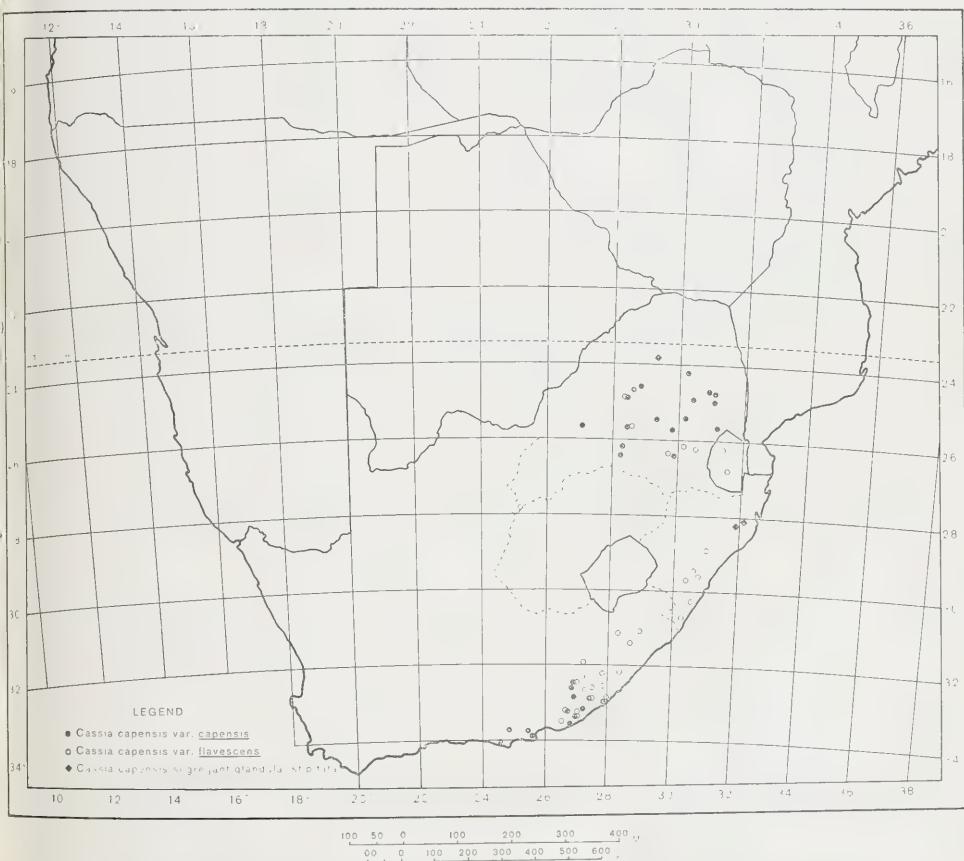
var. *capensis*TRANSVAAL—2428: Waterberg distr., Nylstroom (-CB), *de Jongh s.n.* (Galpin Herb. 6478 GRA).—2527 (Rustenburg): Rustenburg distr., Rustenburg (-CA), *Lanham 24* (PRE).—2628 (Johannesburg): Kempton Park distr., between Johannesburg & Irene (-AB), *Hutchinson 2609* (PRE).

FIG. 5.

Cassia capensis—known distribution in southern Africa (excluding Rhodesia and Moçambique) up to 1974.

—2629 (Bethal) Ermelo distr., Athole Pasture Research Station (-DB), *Preller 145* (PRE).

CAPE—3324 (Steytlerville): Hankey distr., Van Stadenshoogte (-DD), *MacOwan 2051* (GRA).

—3325 (Port Elizabeth): Kragga Kamma, *Long 889* (PRE, GRA, RU).

var. *flavescens*

TRANSVAAL—2428 (Nylstroom): Warmbad distr., Warmbaths (-CD), *Leendertz 5546* (PRE).

—2630 (Carolina): Carolina distr., Carolina (-AA), *Rademacher 99* (PRE).

SWAZILAND—2631 (Mbabane): Mbabane distr., Hawane Falls (-AC), *Compton 27405* (NBG); Black Umbuluzi Valley (-AC), *Karsten s.n.* (NBG); Hlatikulu distr., Hlatikulu (-CD), *Stewart 110* (NBG, K).

NATAL—2830 (Dundee): Kranskop distr., Kranskop (-DD), *Thode 4032* (STE).

—2930 (Pietermaritzburg): Camperdown distr., Key Ridge (-DA), *Gordon-Gray 6145* (NU).

—3030 (Port Shepstone): Port Shepstone distr., cliffs above Otterburn Halt (-CD), *Hilliard 2751* (NU).

CAPE—3128 (Umtata): Transkei, Umtata distr., slope towards Umtata waterfall (-DB), *Schonland 3804* (PRE, GRA).

—3227 (Stutterheim): East London distr., 16 km. from East London on Kingwilliamstown rd. (-DD), *Comins 995* (GRA).

segregant *glandula-stipitata*

TRANSVAAL—2428 (Nylstroom): Pietersburg distr., 11 km. e. of Magalakwin Causeway (-BB), *Mogg 24430* (PRE).

NATAL—2832 (Mtubatuba): Hlabisa distr., Hluhluwe Game Reserve (-AA), *Ward 2439* (NU, NH); Hlabisa, Gunjanene area (-AB), *Ward 2709* (NU).

3. *Cassia biensis* (Steyaert) Mendonça & Torre in Bol. Soc. Brot. Ser. 2a, **29**: 33, Tab. 1, C, (1955); Exell & Mendonça in Con. Fl. Angol. **2**: 184, Tab. 38 C (1956); Schreiber in Prod. Südwestafrika, ed. Merxmüller, **59**: 11 (1967). Type: Angola, Bie, *Gossweiler 9* (BR, holo.).

C. katangensis (Ghesq.) Steyaert var. *biensis* Steyaert in Bull. Jard. bot. Etat Brux. **20**: 260 t. 10, E, F (1950).

The low-growing perennial, *C. biensis*, has not been previously considered in relation to South African species. There is little doubt of its affinity with *C. capensis*, especially var. *capensis*. This relationship is evident in growth form and leaf structure. There are differences, however, in its generally smaller size, especially flower size (Fig. 1 C1), its supra-axillary inflorescences, and an almost indefinable yet perceptible difference in leaflet venation (Fig. 2e).

Plants of *C. biensis* from South and South West Africa tend to look more nearly glabrous than do plants of *C. capensis*, possibly because they mostly lack the long patent hairs (Fig. 3c), which although lacking or sparse in var. *capensis*, must be considered a feature of *C. capensis* as a whole.

Probably because of the stalked petiolar gland (Fig. 1 B5), the entity *biensis* was first placed with *C. katangensis* as a variety. Bearing in mind its relationship to *C. capensis*, consideration was given during the present study, to

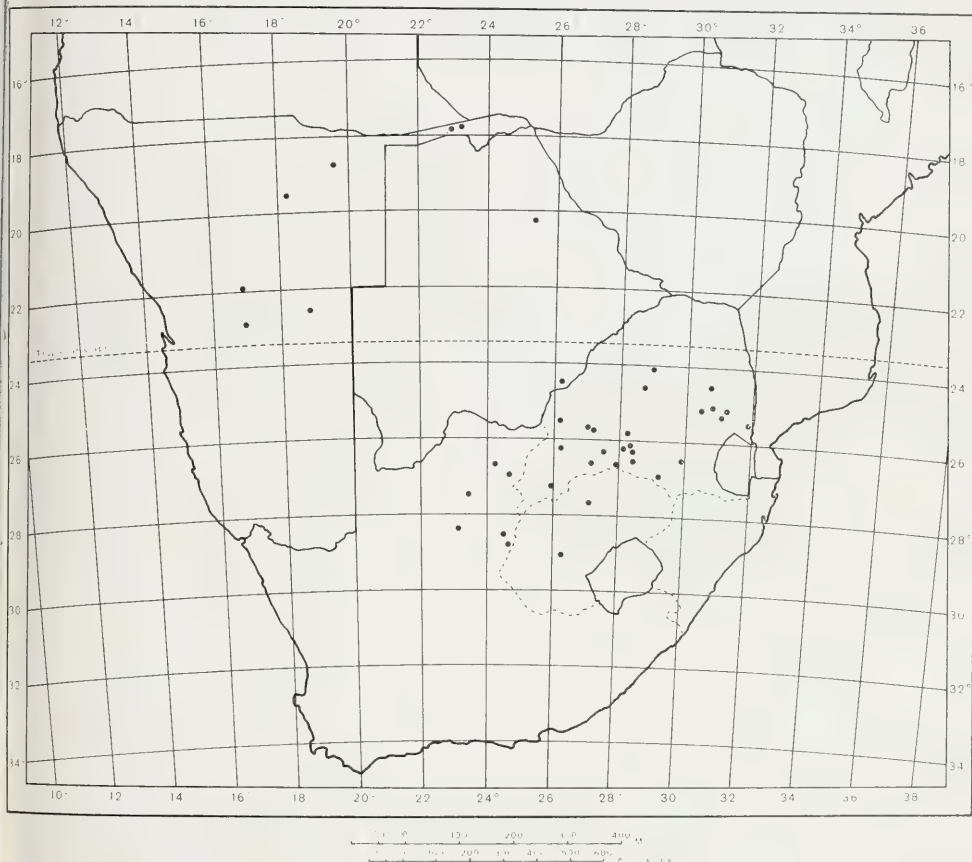


FIG. 6.
Cassia biensis—known distribution in southern Africa (excluding Rhodesia and Moçambique) up to 1974.

C. biensis being reduced again to varietal status under *C. capensis*. Morphological discontinuity does exist between the two taxa however, while there are also differences in distribution and in habitat tolerances. *C. biensis* must therefore remain a species. Plants are to be found growing under the dry, extreme climates of the central and western Transvaal, the Orange Free State, the northern Cape, Botswana and the less harsh parts of South West Africa (Fig. 6). Thus they seem more tolerant of drier habitat conditions than are plants of any of the varieties of *C. capensis*. The small flowers of *C. biensis* suggest this species may be inbreeding, as are some small flowered annual species within *Chamaecrista*, but this needs experimental confirmation.

SELECTED CITATIONS

SOUTH WEST AFRICA—1819 (Karakuwisa): Okavango distr., Cigarette, n.e. of Karakuwisa (-DB), *Maguire 2212* (PRE, WIND).

—2118 (Steinhausen): Gobabis distr., farm Steinhausen (-CC), *De Winter 2443* (PRE, WIND).

BOTSWANA—2025 (Mumpswe): Northern distr., Odiakwe, (-AB), *Wild & Drummond 6825* (PRE).

—2426 (Mochudi): Gaborone distr., Mochudi (-AC), *Harbor 17043* (PRE).

TRANSVAAL—2428 (Nylstroom): Potgietersrus distr., Percy Fyfe Nature Reserve (-BB), *Huntley 1114, 1237* (PRE).

—2430 (Pilgrim's Rest): Pilgrim's Rest distr., beyond Blyde R. Nature Reserve, Ohrigstad rd. (-DD), *Hilliard & Burt 6031* (PRE, NU).

ORANGE FREE STATE—2727 (Kroonstad): Kroonstad distr., *Pont 352* (BLFU).

—2926 (Bloemfontein): Bloemfontein distr., Bloemfontein, near racecourse (-AA), *Potts 2922* (PRE, BLFU).

CAPE—2624 (Vryburg): farm Palmyra, 96 km. n.w. of Vryburg (-AA), *Rodin 3499* (PRE).

—2824 (Kimberley): Barkly West distr., Barkly West (-DA), *Wilman 1471* (PRE).

4. *Cassia falcinella* Oliv., Fl. Trop. Afr. **2**:281 (1871); Bak. f., in Leg. Trop. Afr.: 641 (1930); Ghesq. in Bull. Jard. bot. Etat Brux. **9**:162 (1932), excl. var. *longifolia*; Steyaert in Fl. Congo Belge **3**:520 (1952); Brenan in Kew Bull. **14**:178 (1960) et in F.T.E.A. Leg. (Caesal.): 90 (1967). Type: Tanganyika, Bukoba distr., Karagwe, *Grant 445* (K, holo.).

A variable species within which several infraspecific categories have been recognized. Of these, var. *longifolia* Ghesq. (1932) is no longer considered conspecific and is placed with *C. parva* Steyaert (Brenan 1960:178 & 1967:89). The other three, namely var. *parviflora* Steyaert (1950:251), var. *intermedia* Brenan (1960:178–9) and the typical variety, appear to divide the species satisfactorily

in the opinion of the last-named author (loc. cit.). Var. *intermedia* and var. *falcinella*, which mainly differ in the nature and density of the indumentum of the stipules, are large flowered perennials entirely tropical African in distribution. It is only var. *parviflora*, a small flowered annual, that extends to southern Africa, reaching Rhodesia and northern South West Africa (Fig. 7).

—var. **parviflora** Steyaert, Bull. Jard. bot. Etat Brux. **20**: 251 (1950) et in Fl. Congo Belge **3**: 521 (1952); Brenan in Kew Bull. **14**: 178 (1960) et in F.T.E.A.

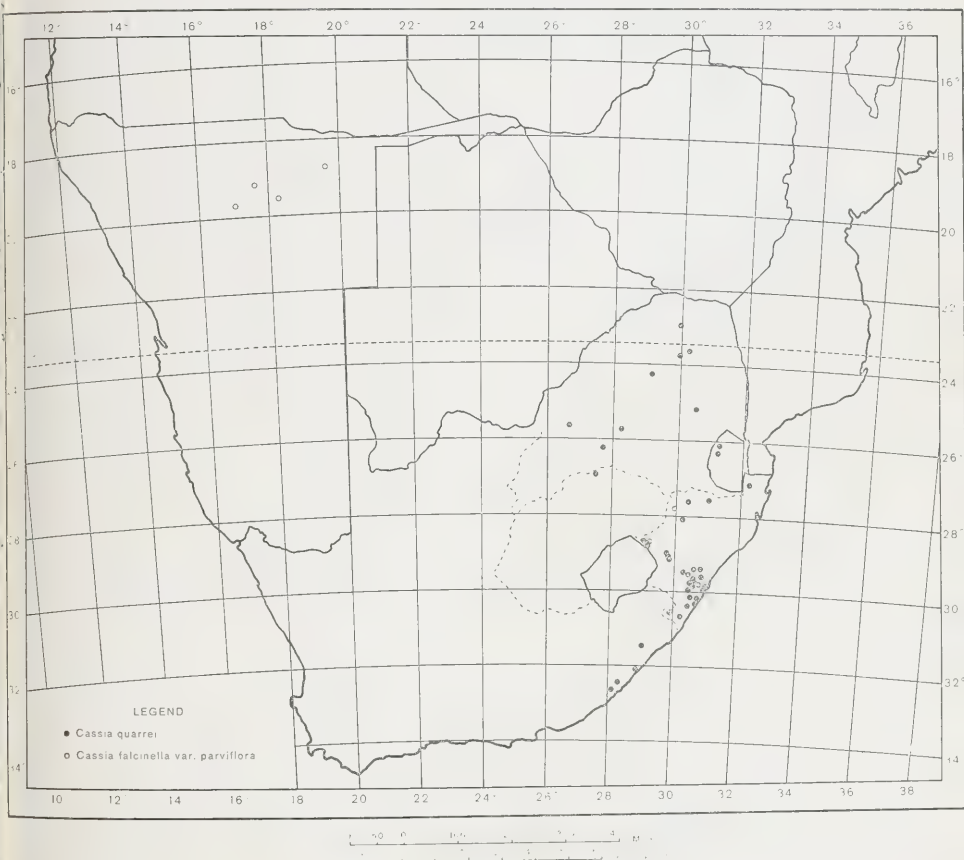


FIG. 7.

Cassia quarrei and *Cassia falcinella* var. *parviflora*—known distribution in southern Africa (excluding Rhodesia and Moçambique) up to 1974.

Leg. (Caesal.): 90 (1967); Schreiber in Prod. Südwestafrika, **59**: 11 (1967). Type: Rwanda Republic, Gabiro, *Becquet 613* (BR, holo!).

In describing this variety Steyaert commented upon its relationship with *C. capensis*, but indicated there were differences in the supra-axillary inflorescences and the short pedicels. *C. capensis* also possesses very much larger flowers, slightly stalked petiolar glands (Fig. B7) and is perennial: in fact var. *parviflora* shows closer affinity with *C. biensis* which bears small flowers on short supra-axillary pedicels, but otherwise has most of the characters of *C. capensis*. It differs from *C. mimosoides*, another annual also present in South West Africa, in the channelled, not crested, adaxial surface to the leaf rhachis, the elliptical rather than round petiolar gland and the coarser, more hairy leaves with many fewer leaflet pairs. The stipules of var. *parviflora* are also slightly falcate rather than straight. Undoubtedly the closest relationships of this variety lie with *C. quarrei*, from which it differs in the much more marked asymmetry of its leaflet midrib (Fig. 2b). Plants have not been seen under field conditions, but some herbarium specimens show lateral branches that are at right angles to the main axis of growth. This should be checked upon to see whether it might prove a useful indicator character of the taxon. The annual habit and the small, pale flowers developed close to the stem suggest plants may be predominantly in-breeding.

SELECTED CITATIONS

SOUTH WEST AFRICA—1819 (Karakuwisa): Cigarette, n.e. of Karakuwisa (-DD), *Maguire 2437* (NBG).

—1820 (Tarikora): Okavango distr., Ndonga Camp, *De Winter & Marais 4619* (PRE).

—1917 (Tsumeb): Tsumeb (-BB), *Dinter 1314* (NBG).

5. *Cassia quarrei* (Ghesq.) Steyaert, Bull. Jard. bot. Etat Brux. **20**: 264, Fig. 26 (1950); Steyaert in Fl. Congo Belg. **3**: 522 (1952); Brenan in F.T.E.A. Leg. (Caesal.): 95 (1967). Type: Congo Republic, Katanga, Étoile, *Quarré 380* (BR, lecto!).

Chamaecrista stricta E. Mey., Comm. Pl. Afr. Austr. **1**: 159 (1836). Type: South Africa, E. Cape Province, R. Bashee, *Drège* (K, iso.).

Cassia stricta (E. Mey.) Steud., Nom. ed. 2, 1: 308 (1840) non Schrank (1819).

C. mimosoides L. var. *stricta* (E. Mey.) Harv. in Fl. Cap. **2**: 273 (1862).

C. kirkii Oliv. var. *quarrei* Ghesq. in Bull. Jard. bot. Etat Brux. **9**: 153 (1932), pro parte sec. Steyaert.

C. capensis Thunb. var. *humifusa* Ghesq. in Bull. Jard. bot. Etat Brux. **9**: 164 (1932), pro parte, quoad *Robyns 2448* (BR).

Plants of *C. quarrei* are true annuals for they are not known to persist for more than a single growing season. The small, pale yellow flowers suggest they

are inbreeders, which has been supported by evidence obtained from pot culture (Schorn & Gordon-Gray, in press). In these characters *C. quarrei* closely resembles *C. mimosoides segregant natalensis*, which is similar in general facies and which grows with *C. quarrei* over some of its range. These taxa are thus easily confused. They are best distinguished by the form of the adaxial surface of the leaf rhachis (Fig. 1 A1): staminal differences are also reliable.

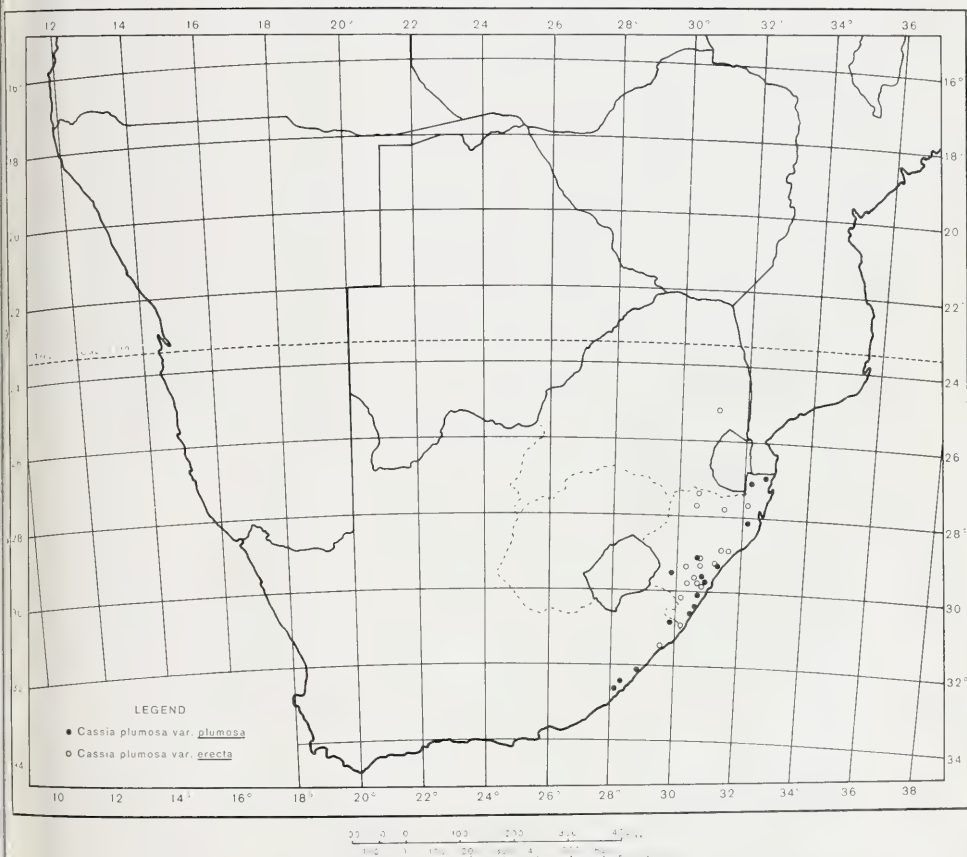


FIG. 8.
Cassia plumosa—known distribution in southern Africa (excluding Rhodesia and Moçambique) up to 1974.

C. quarrei exhibits little variability throughout its range in South Africa and specimens show close agreement morphologically with tropical examples, but no plants, either living or in herbaria, were found to have attained two to three metres, the height recorded for them by Steyaert (1950). Plants favour disturbed areas, especially roadsides, where extensive local populations may develop. As a weed *C. quarrei* is, however, not aggressive. A gathering made in 1967 shows that plants are still present at the mouth of the Bashee river from where Drège collected, before 1836, the specimen that was to become the type of Meyer's *Chamaecrista stricta*. (Figs. 1 B6; 2a; 7).

SELECTED CITATIONS

TRANSVAAL—2627 (Potchefstroom): Krugersdorp distr., farm "Gladysvale" nr. Krugersdorp (-BB), *Rodin 3926* (PRE).

SWAZILAND—2631 (Mbabane): Piggs Peak distr., between Piggs Peak and Mbabane (-AB), *Werdermann & Oberdieck 2205* (PRE).

ORANGE FREE STATE—2627 (Potchefstroom): Parys (-CD), *Potts 533* (BLFU).

NATAL—2830 (Dundee): Dannhauser distr., farm "Broadfields" (-AA), *Schorn 7* (NU, K).

—2929 (Underberg): Estcourt distr., Estcourt (-BB), *West 1790* PRE, NH).

—2930 (Pietermaritzburg): Umsindusi R. at foot of Braid St. (-CB), *Schorn 10* (NU).

CAPE—3228 (Butterworth)—Elliotdale distr., The Haven, Bashee R. mouth (-BB), *Gordon-Gray 1379* (NU).

6. *Cassia plumosa* (E. Mey.) Vogel, Syn. Gen. Cassiae: 65 (1837).

Chamaecrista plumosa E. Mey. in Comm. Pl. Afr. Austr. 1: 159 (1836).

Type: South Africa, E. Cape Province, between Bashee R. (Basche) and Umtata, alt. 1 500 ft., *Drège s.n.* (K, iso.).

At first glance *C. plumosa* resembles *C. capensis*. Both are large flowered, long petioled, perennial species that have a place in primary vegetation types, particularly of coast situations: neither are transient ruderals. But there are constant differences that distinguish them. Most important is the form of the leaf rachis, which in *C. capensis* is channelled adaxially. This channel is not always clearly defined, its two margins sometimes adhering and obscuring the space between, but even so there is little chance of confusion with *C. plumosa* where a short crest of tissue is developed along the mid-axial line of the rachis on its adaxial side. Viewed from the side, this wing is crenate in outline with the sinuses corresponding with the points of insertion of the leaflets: the crests of the crenations are usually ciliate (Fig. 1A2).

The crested leaf rhachis exhibited by *C. plumosa* is also a feature of *C. mimosoides* L., the best known species of *Chamaecrista*. It is thus hardly surprising that specimens of *C. plumosa* are frequently named *C. mimosoides*; indeed many workers in South Africa have treated the entity more correctly known as *C. plumosa*, as one of the forms of *C. mimosoides*. But the two are different: *C. mimosoides* is annual; *C. plumosa* perennial with a well defined

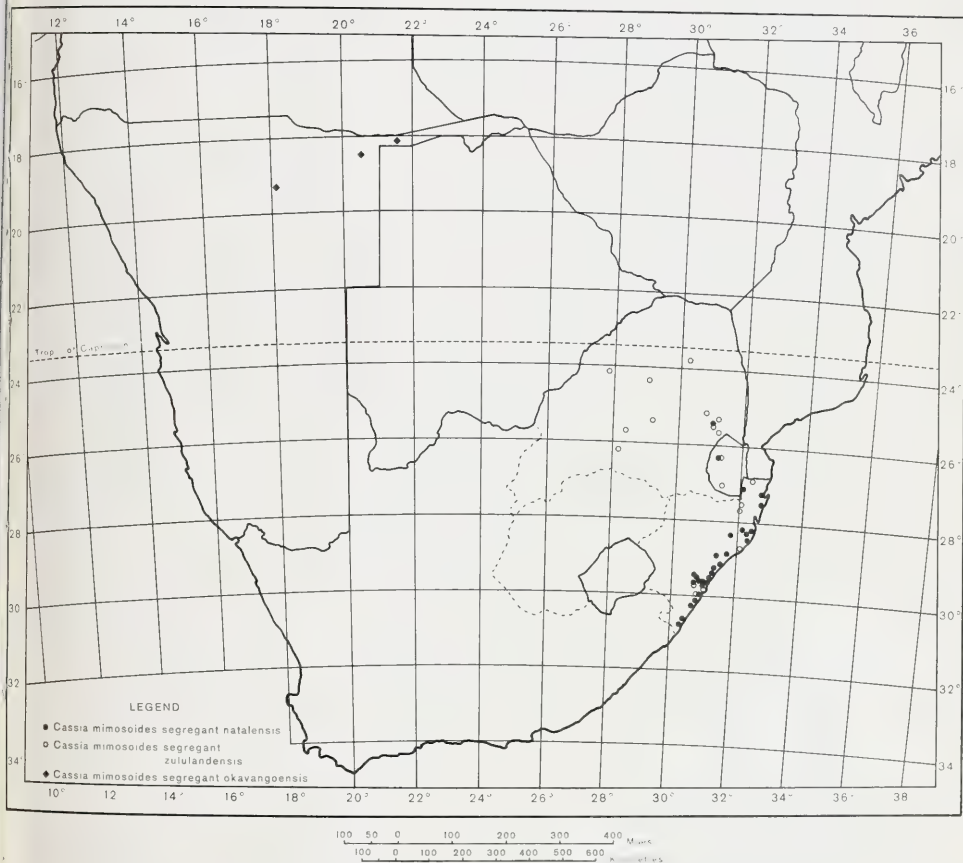


FIG. 9.
Cassia mimosoides—known distribution in southern Africa (excluding Rhodesia and Moçambique) up to 1974.

rootstock that develops, with time, numerous slender, horizontally-spreading ramifications.

C. plumosa is not homogeneous, the variability within it being almost as wide as is the case within *C. capensis* and *C. mimosoides*, the taxa with which it is most readily confused. An isotype at Kew of Drège's type agrees closely with *Ward 1873* from Hluhluwe, Natal (kindly compared by Dr. J. H. Ross). Ward's plant is representative of what must be considered typical *C. plumosa* (at least until Meyer's holotype has been located and compared). Such plants, in the field, are more or less rounded, compact, diffusely-branched, low-growing herbs or sub-suffrutescences seldom exceeding 40 cm in height. Plants of some populations (for example, *Schorr 5* at Bothas Hill, Natal) are more or less prostrate, possibly having been pruned by grazing animals. The aerial parts of all specimens are glabrous, glabrescent or pubescent with appressed curved hairs (Fig. 3b), while the leaves are glaucous. Variety *plumosa*, as this entity must be known taxonomically, is mainly coastal, extending from Moçambique through Natal into the Transkei and the Eastern Cape (Fig. 8). Populations grow usually in sand.

Meyer, 1837 under *Chamaecrista plumosa*, recognized variety *diffusa* (Type: South Africa, Cape Province, near Umzimkulu [Omsamculo], below 100 ft. alt., *Drège s.n.*—whereabouts unknown), which he distinguished from the type of var. *plumosa* on the more diffuse branching, smaller almost glabrous leaves with more pairs of leaflets, more clearly axillary pedicels and smaller flowers. Meyer, himself, stressed the exceedingly close relationship between type and variety, but notwithstanding, he believed the variety might stand. Another specimen from Umzimkulu (*Tyson 1167 p.p.*) falls within the limits of variety *plumosa*. This, as well as present study of the species in herbarium and field, suggests that Meyer's var. *diffusa* forms merely part of the range of var. *plumosa*. It is therefore not taken up here, but its status will need review if the type, when located, is found to differ appreciably from the type of *C. plumosa* var. *plumosa*.

A far more clearly defined variant within *C. plumosa* than variety *diffusa*, is an erect, spindly form that produces one, sometimes two, or few stems, from 0.4 to 1.25 m in height, from the perennial rootstock. These stems develop sparse willowy branches in the upper half. Such plants usually develop a velutinous indumentum of straight, patent hairs that is fulvous or yellow, and especially evident, even to the naked eye, on stems and the abaxial surfaces of leaflet rhachises (Fig. 3a). Sometimes, however, these characters are not correlated and tall, spindly, few stemmed plants may be densely or sparsely pubescent, or glabrescent, the hairs being curved and appressed.

Populations of these tall plants are common and find their best expression in the Camperdown district of Natal (especially the Inchanga area), but they are also frequent further inland to altitudes of approximately 700 m. They also occur in the eastern Transvaal and the Transkei. Many populations of these tall

plants of *C. plumosa* are uniform and readily distinguished from the diffusely branched prostrate or more erect, rounded plants typical of the species. There are others in which the plants are more or less intermediate in growth form, degree of branching and indumentum. Such plants are not easy to place varietyally, but in the field where growth form, texture and colour are more readily assessed, the distinctions are more apparent than in the herbarium.

The range of variability described for *C. plumosa* parallels closely that represented within *C. capensis* (see vars. *capensis* and *flavescens*). Since infraspecific taxa are already in use within *C. capensis*, variety *erecta* is established within *C. plumosa* to accommodate the tall, spindly plants, for the sake of uniformity.

—var. ***erecta*** Schorn and Gordon-Gray var. nov.

Plantae erectae, usque ad 2,5 m altae. *Caules* soli vel pauci a caudice, ramosi non nisi in dimidio superiore, plerumque velutini, saepe fulvi vel flavidi, vestiti pilis rectis, patentibus, flavidis, nonnunquam pubescentes vel glabrati, vestiti pilis curvatis, appressis. *Folia* 32–77 mm longa; foliola 23–46 juga, 4–7 mm longa 0,7–1,2 mm lata; glans petioli sessilis, circularis, ovata-elliptica vel elliptica, concavaque cyathiformis vel depressa superficiei, 0,3–0,8 (—1,6) mm longa, 0,3–0,8 mm lata; pedicelli 18–30 mm longi; petala 10–17 mm longa.

Holotypus varietatis: S. Africa, Natal, Camperdown distr., Inchanga, Schorn 36 (NU). *Topotypi*: Hilliard 2722; 3883 (NU)

It is possible that some of the variability within *C. plumosa* (especially some of that accommodated in var. *erecta*) is the result of sporadic hybridization with plants of another taxon of the Section *Chamaecrista* (possibly *C. mimosoides* segregant natalensis), for occasional plants such as *Ward* 6743 (Durban distr., Reservoir Hills, NU, UDW) and *Strey* 6568 (Hlabisa distr., Monzi Settlement, NU, NH) show a combination of characters suggestive of both these species. Field studies of populations in the localities where these plants were growing are needed.

C. plumosa, while being predominantly south-eastern in distribution, has relationship with some tropical African taxa. Brennan (1960: 185) established *C. polytricha* and distinguished it by its dense, longer, spreading indumentum from *C. plumosa* which he named as "probably its closest ally". This study has indicated that the presence of a velutinous indumentum consisting of long, spreading hairs is a common feature of *C. plumosa* var. *erecta* in South Africa. However, this variety may be distinguished from *C. polytricha* var. *polytricha*, by differences in leaflet venation and by the long-ciliate leaflet margins of the last-named taxon. The two other varieties recognised within *C. polytricha* are both annual. (Figs. 1 B12; 2h also apply to *C. plumosa*).

SELECTED CITATIONS

var. *plumosa*

MOÇAMBIQUE—2235 (Mapinhane): Vilanculos (-AB), *Gomes e Sousa & Balsinhas 5110* (PRE).

NATAL—2732 (Ubombo): Ingwavuma distr., Vazi Swamp (-BB), *Moll 4742* (PRE, NU).

—2832 (Mtubatuba): Hluhluwe Game Reserve (-AA), *Ward 1873* (NH, NU).

—2930 (Pietermaritzburg): Camperdown distr., Botha's Hill (-DC), *Schorn 5* (NU).

CAPE—3029 (Kokstad): Umzimkulu distr., Clydesdale (-BD), *Tyson 1167 p.p.* (PRE, SAM).

—3228 (Butterworth): Komgha distr., near Kei Mouth, *Flanagan 1127* (PRE, GRA).

var. *erecta*

TRANSVAAL—2531 (Komatipoort): Nelspruit distr., n. of Whiteriver (-AC), *Grobelaar 1098* (PRE).

NATAL—2731 (Louwsberg): Ngotshe distr., Ngome Forest (-CD), *Tinley 743* (NU).

—2831 (Nkandla): Eshowe distr., Hlinza Forest (-CD), *Edwards 2870* (PRE, NU).

—2930 (Pietermaritzburg): New Hanover distr., 2 ml. w. of Noodsberg (-BC), *Moll 1492* (PRE, NH, NU); Camperdown distr., Inchanga (-DA), *Schorn 36* (NU).

—3030 (Port Shepstone): Port Shepstone distr., 8 km. from Port Edward on Izingolweni rd. (-CC), *Hilliard 3042* (NU).

7. *Cassia mimosoides* L., Sp. Pl.: 379 (1753); Harv. in Harv. & Sond. Fl. Cap. **2**: 273 (1862) excl. vars.; Forbes in S. Afr. J. Sci. **18**: 344 (1922) excl. vars.; Burt Davy in Fl. Plants & Ferns of Tvl. & Swaziland **2**: 325 (1932) excl. syn.; Steyaert in Bull. Jard. bot. Etat Brux. **20**: 236, 240, 247, Tab. 8 (1950) et in Fl. Congo Belge **3**: 514, Tab. 37 (1952); De Wit in Webbia, **11**: 283 (1955); Mendonça & Torre in Consp. Fl. Angol. **2**: 181 (1956); Brenan in F.T.E.A. Leg. (Caesal.): 100–103 (1967); Schreiber in Prod. Südwestafrika, **59**: 12 (1967). Types: Ceylon, Herb. Hermann vol. 2: 13,78 (BM, syn.).

Previous authors, among them Steyaert (1950) and Brenan (1967) have commented at length on the variability of this Asiatic and African species, and all who have attempted to treat it taxonomically have found difficulty in analysing its many forms. The type is from Sri-Lanka (Ceylon), but Steyaert (1950: 247) believed that the species was African rather than Asian, occupying the whole tropical zone to the south of the Sahara and extending, in the south west to the

estuary of the Congo and perhaps the north of Angola, and in the south east to Lourenço Marques. He also believed it exhibited greater variability in Africa than in Asia. Brenan (1967) in revising *Cassia* in Tropical East Africa recognized within *C. mimosoides* seven groups to which he gave symbols but did not name. Three of these he stated extended into South Africa; one to the Transvaal; one to Natal; for the third no limit was given. There is no doubt that the species does extend into South Africa (Fig. 9). Schreiber (1967) recorded it for South West Africa; Compton (1966) for Swaziland; Jacot Guillarmod (1971) one specimen for Lesotho, and early workers such as Harvey (1862), Forbes (1922) and Burtt Davy (1932) for South Africa itself. The three last named authors considered the species in a broad sense, including within it, usually at varietal level, all South African representatives of the Section *Chamaecrista*. Notwithstanding this approach, it is certain that *C. mimosoides* in the narrow sense of the species accepted here, was represented in South Africa at the time of their work.

In this narrow sense, *C. mimosoides* may be distinguished from all other species of the Section *Chamaecrista* represented in the area of the *Flora of Southern Africa* by the following plexus of characters:

Plants annual, or perennating into a second season or longer if conditions are favourable, tap-rooted, never developing a perennial rhizomatous rootstock producing new aerial stems annually. Adaxial surface of the leaf rhachis crested, the crests, in profile, being symmetrically or asymmetrically crenate, or serrate.

Even when thus narrowly diagnosed, *C. mimosoides* is not without variability in the area under consideration. Three entities have been recognized within this species for this area. These are not morphologically discontinuous and plants that do not fully conform to one entity or another (some of them are intermediate), are not uncommon. To some extent at least, the entities are linked with geography (and possibly habitat), as Brenan (1967: 100) stated was the case for tropical variants also, but to some extent, too, they are sympatric, for there is some degree of overlap between some of their ranges. These entities are themselves not entirely homogeneous, as will be indicated later.

Comparison of representatives of these entities against Hermann's types and against specimens of Brenan's groups in tropical Africa, led to the conclusion that in no case was agreement sufficiently precise to permit the recognition of direct relationships. With such extreme variability within the species, and with some parts of the range of *C. mimosoides* in Africa not yet fully documented (Rhodesia and Moçambique in particular), it would be unwise, indeed foolish, to attempt to establish formal infraspecific categories for the three Southern African entities.

For convenience, and since each is, to some extent, linked with geography, each is regarded as a segregant from the typical form and named according to the locality in which it is mainly represented.

The main characteristics of these segregants and their main areas of distribution are given in Table 1.

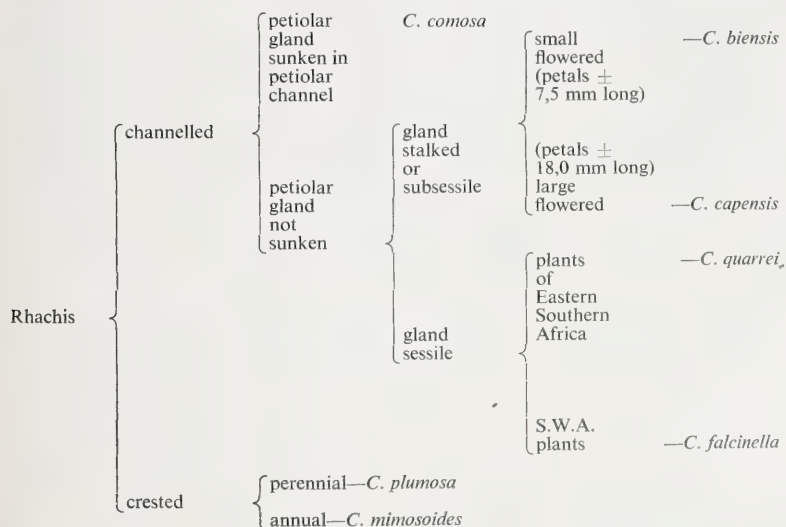
Table 1—More important morphological features of Southern African segregants within *C. mimosoides* L.

<i>segregant</i>	<i>natalensis</i>	<i>zululandensis</i>	<i>okavangoensis</i>
petiolar gland	sessile, elliptic, projecting laterally over petiole; 0,7–1,7 mm long; 0,5–1,0 (–1,3) mm wide	sessile, circular-elliptic or circular; 0,2–0,6 mm long; 0,2–0,3 mm wide.	sub-sessile to sessile, usually circular, usually 0,4 mm in diameter.
sculpturing of adaxial surface of leaflet rhachis	crested crests crenate both symmetric and asymmetric in same leaf	crested crests crenate both symmetric and asymmetric in same leaf	crested crests crenate asymmetric or serrate (different plants)
flower colour	pale yellow	creamy yellow	bright yellow
petal length	5,5–7,5 mm	5,0–7,5 mm	5,0–7,5–10,0 mm
pedicel length (at flowering)	(6,0–) 8,0–12,0 mm	5,0–14,0 mm	10–14 or 20–25 mm
indumentum stems ovaries	pubescent; hairs curved appressed lanate; hairs fine, matted	pubescent; hairs curved appressed lanate; hairs fine, matted	glabrescent; hairs curved appressed strigose; hairs coarse, straight
distribution	mainly coastal Natal; also Tvl., Swaziland, Moçambique	mainly coastal Zululand; also Tvl., Swaziland, Moçambique, Rhodesia	north-eastern South West Africa; possibly Botswana and Rhodesia

Segregant *okavangoensis* is a delicate annual with long feathery leaves; it can attain over 1½ metres in height with erect stems about 4 mm in diameter. It grows usually in sand and favours damp or wet conditions: presumably it can behave as a weed. In South West Africa it is not homogeneous but consists of two forms very closely related: the one is small flowered (petals 5,0–7,5 mm long) with fine, slender pedicels (20–25 mm long) and crests to the rhachis asymmetrically crenate in profile; the other is larger flowered (petals 7,5–10,0 mm long) with shorter pedicels (10–14 mm long) and crests to the rhachis markedly serrate in profile. The last form resembles Hermann's types from Sri-Lanka closely, but differs in the long, lateral branches usually developed from ground level, and the slightly larger flowers. Both these forms Schreiber (1967, 59: 12) accepted without comment as *C. mimosoides* and it may well be shown eventually that both fall within the range of variation of the species in its type locality (Figs. 1B 10, 11).

Table 2—Summary of the main characters used in identification of the Southern African (excluding Rhodesia and Moçambique) species of *Cassia*, Section *Chamaecrista*

Species	Duration of Plant	Rhachis Form	Petiolar Gland			Relative Flower Size
			Attachment	Shape	Relative Size	
<i>comosa</i>	perennial	channelled	sessile sunken	elliptic	large	large
<i>capensis</i>	perennial	channelled	short-stalked to subsessile	circular	small	large
<i>biensis</i>	perennial	channelled	short-stalked	circular	small	small
<i>falcinella</i>	annual	channelled	sessile	elliptic	medium	small
<i>quarrei</i>	annual	channelled	sessile	elliptic	medium	small
<i>plumosa</i>	perennial	crested	sessile	circular	medium-small	large
<i>mimosoides</i>	annual or short-lived perennial	crested	sessile or sub-sessile	elliptic or circular	medium-large or small	small to medium



Diagrammatic Scheme for Rapid Preliminary Identification of Southern African (excluding Rhodesia and Moçambique) species of *Cassia*, Section *Chamaecrista*.

NOTE: When using this key refer to Fig. 1.

Segregant natalensis differs quite markedly in facies from segregant okavangoensis and may well eventually be given infra-specific status within *C. mimosoides*. The large elliptic petiolar gland (Fig. 1B 8) serves to distinguish it most convincingly, but there are several other differences including flower colour, pedicel length and indumentum to ovaries and stems that add to its different appearance. The elliptic petiolar gland is similar to that of *C. quarrei*: indeed this segregant may readily be confused with *C. quarrei* with which it sometimes grows. Another feature suggestive of *C. quarrei* is the nature of the crest to the adaxial rhachis surface, which is grooved along the summit, sometimes quite deeply, the margins of this groove being ciliate. Over much of its range, probably all of it, segregant natalensis is sympatric with *C. plumosa*. Evidence of *C. plumosa* is reflected in *C. mimosoides* segregant natalensis in the curve of the crests to the adaxial leaflet surface. These vary in individual leaves from symmetrically crenate (as in *C. plumosa*) to asymmetrically crenate (as in *C. mimosoides*). Whether these features of similarity reflect introgression in the past is uncertain at present.

Segregant zululandensis resembles segregant natalensis closely, differing mainly in the much smaller circular-elliptic to circular petiolar gland (Fig. 1B 9) that is characteristic of typical *C. mimosoides*. There are differences also in the plants being less robust and branching laterally from immediately above ground level, and the pale almost cream flowers. This segregant is not entirely homogeneous and included in it are freely branching plants with circular glands that produce deeper yellow flowers and longer petioles (both characters suggestive of segregant okavangoensis). Segregant zululandensis, in its pale flowered form, is most common in Zululand, particularly towards the coast, but it extends southwards as far as Durban and northwards into the Transvaal and Rhodesia. In the north the brighter yellow flowered, long pedicelled plants seem to predominate and may link with segregant okavangoensis, but this needs confirmation from further field study.

SELECTED CITATIONS

segregant okavangoensis

SOUTH WEST AFRICA—1820 (Tarikora): Grootfontein Nord distr., 16 km. n. of Tamso on Kapupahedi rd. (-BC), *De Winter & Marais 4728 p.p.* (PRE).

—1821 (Andara): Caprivi-Zipfel, Popa Fälle (-BA), *Merxmüller & Giess 2020* (PRE, WIND).

segregant natalensis

TRANSVAAL—2430 (Pilgrim's Rest): Pilgrim's Rest distr., Mariepskop (-BD), *Werderman & Oberdieck 1816* (PRE).

—2530 (Lydenburg): Nelspruit distr., Breyer s.n. (PRE, GRA).

SWAZILAND—without precise locality, Stewart 8952 (GRA).

NATAL—2832 (Mtubatuba): Hlabisa distr., St. Lucia Estuary, e. side of Narrows (-AD), Ward 4340 (PRE, NH, NU).

—2930 (Pietermaritzburg): Camperdown distr., Hammarsdale, nr. National rd. (-DA), Schorn 4 (NU); Westville, Chiltern Hills (-DD), Ward 6409 (NU, NDW).

—3030 (Port Shepstone): Port Shepstone distr., Uvongo (-CD), Strey 9706 (PRE, NH, NU).

segregant zuluandensis

TRANSVAAL—2430 (Pilgrim's Rest): Pilgrim's Rest distr., beyond Blyde R. Nature Reserve camp on Ohrigstad rd. (-DA), Hilliard & Burt 6031A (PRE, GRA, NU).

—2530 (Lydenburg): Nelspruit distr., 5 km. s. of Nelspruit (-DB), Leach 12072 (PRE, GRA).

SWAZILAND—2631 (Mbabane): Mbabane distr., Komati R., old ferry (-AA), Compton 29826 (PRE); Hlatikulu distr., Malala, Kubuta Estate (-CD), Pierce 2 (PRE).

NATAL—2632 (Bela Vista): Ngwavuma distr., Ndumu Game Reserve, Ndumu Hill (-CD), Pooley 716 (NU).

—2732 (Ubombo): Ubombo distr., 8 km. n. of Jozini Dam (-AC), Schorn 13 (NU).

—2930 (Pietermaritzburg): Durban distr., Isipingo Flats (-DD), Ward 6527 (NU, UDW).

Key to Species and Intraspecific Taxa of Cassia, Section Chamaecrista, represented in Southern Africa (excluding Rhodesia and Mozambique).

- | | |
|---|----|
| 1. Leaf rachis channelled along adaxial (upper) surface | 2 |
| Leaf rachis not channelled, but crested by an upright wing of tissue developed along the mid-line of the adaxial (upper) surface; this crest of tissue serrate, or symmetrically or asymmetrically crenate when seen in profile | 10 |
| 2. Petiolar gland sessile, oval or elliptic, never circular | 3 |
| Petiolar gland raised on a short, or very short, stalk; if subsessile or sessile, then circular or circular-elliptic with a convex, flat or concave surface. Occasionally glands two, or rudimentary, or wanting | 6 |
| 3. Petiolar gland completely or partially sunken in the channel on the adaxial surface of the petiole and usually separating the channel margins: gland generally exceeding 1,0 mm in length. Petals usually exceeding 7,5 mm in length. Plants perennial | 4 |
| Petiolar gland not sunken in the channel on the adaxial surface of the petiole, sometimes wider than the petiole and thus overlapping it: gland generally less than 1,0 (rarely to 1,2) mm long. Petals not exceeding 7,5 mm in length. Plants annual | 5 |

4. Leaflets 3,0–7,0 mm wide. Gland sunken in the channel of the adaxial surface of the petiole, separating widely its margins and not, or hardly, visible when petiole is viewed from the side. Petals 10,0–15,0 mm long 1. *C. comosa* var. *comosa*
 Leaflets 1,4–3,0 mm wide. Gland not completely sunken in the channel of the adaxial surface of the petiole, not separating so widely its margins, and usually clearly visible when petiole is viewed from the side. Petals 7,5–10,0 (–13,0) mm long 1. *C. comosa* var. *capricornia*
5. Stipules straight. Width of tissue to anticous side of main vein of leaflet approximately half width of tissue to posticous side of the same leaflet. Stamens 8 functional, 2 or 1 staminodal reduced to filiform threads difficult to detect or lacking. Recorded from Swaziland, the Transvaal, Natal and the eastern Cape 5. *C. quarrei*
 Stipules slightly falcate. Width of tissue to anticous side of main vein of leaflet less than half width of tissue to posticous side of the same leaflet. Stamens 10, all clearly recognizable structurally, sometimes not all functional. Recorded from northern South West Africa 4. *C. falcinella* var. *parviflora*
6. Petiolar gland raised on a distinct slender stalk that is 1,0–1,5 mm long 2. *C. capensis*, segregant *glandula-stipitata*
 Petiolar gland raised on a short stalk less than 1,0 mm long, or subsessile, or sessile 7
7. Petals not exceeding 7,5 mm in length. The majority of inflorescences clearly supra-axillary 8
 Petals exceeding 7,5 mm in length. The majority of inflorescences axillary or almost so 9
8. Petiolar gland subsessile, or slightly raised on a short stalk. Plants perennial. Stems usually procumbent or decumbent 3. *C. biensis*
 Petiolar gland sessile, never raised. Plants annual. Main stem erect, branching usually only above ground level, so that no branches are procumbent or decumbent 4. *C. falcinella* var. *parviflora*
9. *Stems with, or without, appressed or short patent hairs; if long patent hairs are interspersed these are few and scattered, so that any indumentum present does not appear villous or velutinous to the naked eye, hairs greyish-white, never fulvus or yellow. Petiolar gland slightly raised, circular. Channel to adaxial surface of rhachis well defined. Usually several prostrate or decumbent stems produced from a perennial rootstock 2. *C. capensis* var. *capensis*
 Stems with appressed and/or short patent hairs with many long patent hairs interspersed, so that the indumentum appears villous or velutinous to the naked eye; indumentum, especially on young parts of stems, greyish-white, fulvus or bright yellow. Petiolar gland often obsolete or wanting, when present subsessile, elliptic-circular. Channel to adaxial surface of rhachis often poorly defined. Usually several robust, prostrate or decumbent stems produced from a perennial rootstock, or one or a few erect stems up to 90 cm high arising from a less definitely perennial rooting system. (Note: some erect, robust plants with poorly developed petiolar glands may be only glabrate) 2. *C. capensis* var. *flavescens*
10. The majority of pedicels, at flowering, exceeding 16 mm in length 11
 The majority of pedicels, at flowering, not exceeding 16 mm in length 14
11. Plants perennial. Crests to adaxial surface of leaflet rhachis symmetrically or asymmetrically crenate when viewed in profile. Petals usually exceeding 10,0 mm long, rarely from 7,5–10,0 mm. Recorded from Moçambique, Natal, the Transvaal and the eastern Cape 12
 Plants annual. The majority of crests to the adaxial rhachis surface of a mature leaf asymmetrically crenate or serrate when viewed in profile (towards the leaf base some may be symmetrically crenate). Petals not exceeding 10,0 mm in length 13

*Note: At points in the key marked with an asterisk occasional plants may prove intermediate and thus difficult to place conclusively with either of the alternatives.

12. *Plants more or less prostrate, much branched sub-suffrutesces, or compact, more or less rounded diffusely branched herbs or sub-suffrutesces usually not exceeding 40 cm in height. Leaves $\pm$ glaucous. Stems glabrous, glabrescent or pubescent with curved appressed hairs 6. *C. plumosa* var. *plumosa*

Plants erect, usually consisting of one or few stems from the perennial rootstock, these stems branching only above the middle to form a narrow rather spindly subshrub up to 2,5 m in height; occasionally shorter and more diffusely branched to form a $\pm$ compact, rounded sub-suffrutex 0,4 to 2,0 m in height. Leaves not markedly glaucous, sometimes yellowish green and puberulous especially towards the base abaxially. Stems villous, velutinous or densely pubescent to the naked eye, indumentum often fulvous or bright yellow, the hairs straight and patent. (Note: occasional erect, rather spindly plants may be glabrescent with the few hairs present curved and appressed) 6. *C. plumosa* var. *erecta*

13. *Petiolar gland sub-sessile or sessile, circular, usually $\pm$ 0,4 mm in diameter: stems glabrescent: ovaries strigose with coarse straight hairs. Petals usually bright yellow. Recorded from South West Africa 7. *C. mimosoides*, segregant *okavangoensis*
Petiolar gland sessile, circular or circular-elliptic, 0,2–0,6 mm long, 0,2–0,3 mm wide: stems pubescent with adpressed hairs: ovaries lanate with fine, more or less matted hairs. Petals usually cream or pale yellow. Recorded from eastern southern Africa, especially Zululand and Natal. 7. *C. mimosoides*, segregant *zululandensis*

14. *Petiolar gland elliptic, projecting laterally over petiole when viewed from abaxial leaf surface, 0,7–1,7 mm long, 0,5–1,0 (–1,3) mm wide 7. *C. mimosoides*, segregant *natalensis*
Petiolar gland circular or circular-elliptic, usually not projecting laterally over petiole when viewed from abaxial leaf surface, 0,2–0,6 mm long, 0,2–0,3 mm wide 7. *C. mimosoides*, segregant *zululandensis*

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